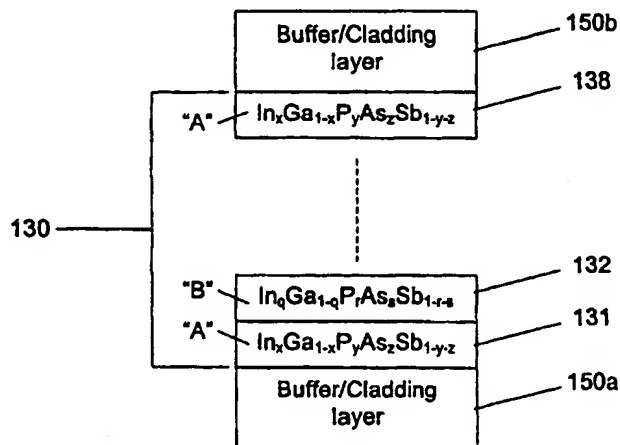




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(21) International Application Number: PCT/US99/28576 (22) International Filing Date: 3 December 1999 (03.12.99) (30) Priority Data: 60/110,718 3 December 1998 (03.12.98) US (71) Applicant (for all designated States except US): ARIZONA BOARD OF REGENTS [US/US]; Arizona State University, Tempe, AZ 85287 (US). (72) Inventors; and (75) Inventors/Applicants (for US only): ZHANG, Yong-Hang [CN/US]; 7259 E. Cortez Road, Scottsdale, AZ 85260 (US). DOWD, Philip [GB/SG]; 55A Nanyang Terrace, Singapore 639732 (SG). BRAUN, Wolfgang [DE/DE]; Hausvogteiplatz 5-7, D-10117 Berlin (DE). (74) Agents: SORELL, Louis, S. et al.; Baker & Botts, LLP, 30 Rockefeller Plaza, New York, NY 10112-0228 (US).	(81) Designated States: JP, KR, US, European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE). Published <i>With international search report.</i> (88) Date of publication of the international search report: 14 September 2000 (14.09.00)	

(54) Title: COMPOUND SEMICONDUCTOR STRUCTURES FOR OPTOELECTRONIC DEVICES



(57) Abstract

A compound semiconductor device is provided that includes a substrate and an active region disposed above the substrate. The active region includes at least two different pseudomorphic layers, the first layer having the form $\text{In}_x\text{Ga}_{1-x}\text{P}_y\text{As}_z\text{Sb}_{1-y-z}$, and the second layer having the form $\text{In}_q\text{Ga}_{1-q}\text{P}_r\text{As}_s\text{Sb}_{1-r-s}$. The first layer includes at least In, Ga, and As, and the second layer includes at least Ga, As, and Sb. It is preferable for the substrate to be GaAs or $\text{Al}_p\text{Ga}_{1-p}\text{As}$ ($0 < p < 1$), or to have a lattice constant close to or equal to that of GaAs. For the first layer, it is preferable if x is between 0.05 and 0.7, y is between 0 and 0.35, z is between 0.45 and 1, and $1-y-z$ is between 0 and 0.25. For the second layer, it is preferable if q is between 0 and 0.25 and $1-r-s$ is between 0.25 and 1.

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INTERNATIONAL SEARCH REPORT

International Application No.
PCT/US 99/28576

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 H01S5/32 H01S5/34 H01L33/00 H01S5/183 H01L31/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
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Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5 767 535 A (BACHEM KARL-HEINZ ET AL) 16 June 1998 (1998-06-16)	1-3, 6-9, 11, 16-19, 23, 25-29, 45-48, 50-52
Y	column 2, line 37-42; figures 4-10	4, 5, 30-44
A	column 3, line 33-60 column 6, line 52 -column 7, line 14 column 8, line 9-62 column 10, line 34-50 --- -/-	10, 12-15, 20-22, 24

☒ Further documents are listed in the continuation of box C.

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PCT/US 99/28576

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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INTERNATIONAL SEARCH REPORT

International Application No.

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A	<p>ZHANG Y -H: "CONTINUOUS WAVE OPERATION OF INAS/INASXSB1-X MIDINFRARED LASERS" APPLIED PHYSICS LETTERS,US,AMERICAN INSTITUTE OF PHYSICS. NEW YORK, vol. 66, no. 2, 9 January 1995 (1995-01-09), pages 118-120, XP000486054 ISSN: 0003-6951 the whole document</p>	1,6,9,10

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